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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,847	02/25/2005	Mitsuo Tsukamoto	Q85912	2196
23373 7590 08/09/2007 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER WU, IVES J	
			ART UNIT 1724	PAPER NUMBER
			MAIL DATE 08/09/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/525,847

Applicant(s)

TSUKAMOTO ET AL.

Examiner

Ives Wu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 3/29/2007.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

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### DETAILED ACTION

(1). Applicants' 2<sup>nd</sup> Request-for-Continued Examination (RCEX), Remarks and Amendments filed on 06/29/2007 have been received.

Claims 1, 2 and 5 are amended. Claims 20-23 are new.

An Office Action in response to the RCEX and Amendments of 06/29/2007 is presented in the following.

#### *Claim Rejections - 35 USC § 102/103*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

(2). **Claims 1, 4-12, 18, 20 and 22** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Saito et al (US06716942B1).

As to step of polymerizing a radical polymerizable monomer in a manner of continuous polymerization in a defined reaction-field to give fluoropolymer avoiding the use of carbon dioxide in a fluoropolymer producing method in **independent claim 1**, Saito et al (US06716942B1) disclose process for producing fluoropolymer (Title). At least one of components forming the reaction field is in supercritical state (Abstract, line 6-7). The process

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for preparing a fluoropolymer by polarizing one or more radically polymerizable monomers comprises at least one fluoroolefin monomer substantially in the absence of water (Col. 2, line 53-56). The polymerization of radically polymerizable monomer is carried out by any of batchwise, semi-batchwise and continuous mode (Col. 7, line 28-30). Saito et al do not disclose the use of carbon dioxide as medium in the teaching.

As to defined reaction-field to be in a supercriticality-expression state and under a pressure of not higher than 40 MPa and a temperature of not higher than that higher by 100 C than the supercriticality-expression temperature of the defined reaction-field in a fluoropolymer producing method in **independent claim 1**, Saito et al disclose the whole pressure in polymerization system to be 40 MPa or less in an absolute pressure and at least one of the monomers is in supercritical state (Col. 2, line 58-60). A polymerization temperature is from 10 °C to 200 °C (Col. 8, line 37-38).

As to supercriticality-expression state to be formed in one-component systems in which one kind of a radical polymerizable monomer exists, or in multi-component systems in which two or more kinds of radical polymerizable monomers exists in a fluoropolymer producing method in **independent claim 1**, Saito et al disclose the in case of using no fluorocarbon and using one monomer, a reaction field in a state exceeding both the critical pressure and critical temperature of the monomer. In case of using no fluorocarbon and using two or more monomers, a reaction field in a state exceeding both of the lowest critical pressure and lowest critical temperature of those monomer (Col. 3, line 20-27).

As to radical polymerizable monomer comprising a fluorine-containing ethylenic monomer in a fluoropolymer producing method in **independent claim 1**, and **claims 7-8**, Saito et al disclose vinylidene fluoride (Col. 4, line 21).

As to a ratio  $[M_w/M_n]$  of the weight average molecular weight  $[M_w]$  on the styrene equivalent basis to a number average molecular weight  $[M_n]$  of the fluoropolymer on the polystyrene equivalent basis to be higher than 1 but not higher than 3 in a fluoro-polymer producing method in **independent claim 1**, Saito et al disclose the Examples which shows the ratio to be around 2.

As to fluoropolymer having a weight average molecular weight  $[M_w]$  of not lower than 150,000 as determined on the polystyrene equivalent basis in a fluoropolymer producing method

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in **independent claim 1**, and **claim 5**, Saito et al disclose the molecular weight of the polymer to be adjusted to a desired weight by chain transfer agent (Col. 6, line 55-57). An amount of the chain transfer agent may be optionally determined depending on a desired molecular weight of the polymer (Col. 7, line 11-13). Although Saito et al disclose the Example 2, which shows the weight molecular weight 40,000. It is well known in the art that long reaction times are also necessary for both high percent conversion and high molecular weight (page 199, Principles of Polymerization, 4<sup>th</sup> Ed., George Odian). In view of the substantially identical polymerization reaction field disclosed by Saito et al and by applicants, it is examiner's position to believe that the supercriticality-expression state of Saito et al would inherently possess the capability of producing weight average molecular weight of the fluoropolymer to be not lower than 150,000 as claimed. Since USPTO does not have proper means to conduct the experiments, the burden now is shifted to applicants to prove otherwise. *In re Fitzgerald*, 205 USPQ 594 (CCPA1980).

As to defined reaction-field having a ratio  $[\rho_m/\rho_o]$  of not lower than 1.1 in **claim 4**, in view of the substantially identical polymerization reaction field disclosed by Saito et al and by applicants, it is examiner's position to believe that the supercriticality-expression state of Saito et al would inherently possess the capability of producing reaction-field having ratio of  $[\rho_m/\rho_o]$  of not lower than 1.1 as claimed. Since USPTO does not have proper means to conduct the experiments, the burden now is shifted to applicants to prove otherwise. *In re Fitzgerald*, 205 USPQ 594 (CCPA1980).

As to reaction vessel at least 8 g/l of capacity in a steady-state of continuous polymerization in **claim 6**, in absence of showing the criticality of the records, the optimization reaction volume of at least 8 g/l in a known process render prima facie obviousness within one of ordinary skills in the art. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

As to initiator in **claim 9**, and initiator being organic peroxide in **claim 10**, selection of organic peroxide in **claim 11**, Saito et al disclose initiator of peroxy dicarbonates (Col. 8, line 52).

As to polymerization of radical polymerizable monomer to be carried out in the presence of a non-ethylenic fluorocarbon in **claim 12**, Saito et al disclose a fluorocarbon to be present in reaction field such as tetrafluoroethane (Col. 6, line 33-35).

As to limitation of **claim 18**, Saito et al disclose the polymerization being carried out in continuous methods, which would require continuously supply monomers and continuously discharge product (Col. 7, line 28-30).

As to optionally additional components in amount which substantially do not influencing supercriticality-expression pressure, temperature of defined reaction field in **claim 20**, Saito et al disclose, when the components forming the reaction field to be a mixture, there is a case where critical pressure, temperature decrease or increase as compared with the case of a single component. However, in the present patentee's invention, as mentioned above, the pressure and temperature may be a minimum critical pressure or more, temperature or more, respectively in an actual reaction field (Col. 8, line 24-31).

As to one or more kinds of radical polymerizable monomers substantially influencing a phase state in **claim 22**, Saito et al disclose in the case of using no fluorocarbon and using two or more monomers, a reaction field in a state exceeding both of the lowest critical pressure and lowest critical temperature of those monomers individually (Col. 3, line 24-27).

(3). **Claims 2-3, 13-17, 19, 21 and 23** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over DeSimone et al (US06716945B2).

As to step of polymerizing a radical polymerizable monomer in a manner of continuous polymerization in a defined reaction-field in the presence of carbon dioxide amounting to 10% or less of the total number of moles of carbon dioxide and radical polymerizable monomer to give the fluoropolymer in a fluoropolymer producing method in **independent claim 2**, DeSimone et al (US06716945B2) disclose a method for forming a fluoropolymer comprising providing a reaction mixture comprising carbon dioxide, at least one fluoromonomer, and an initiator (Abstract, line 1-6). The method can be carried out batchwise, semi-continuously or continuously with through mixing of the reactants in any appropriately designed reaction vessel (Col. 5, line 11-14). In one preferred embodiment, the CO<sub>2</sub> is utilized in a "supercritical" phase. The reaction mixture typically employs carbon dioxide as a continuous phase, with the reaction mixture typically comprising from about 1 to about 99 wt% of carbon dioxide (Col. 2, line 42-54).

As to supercriticality-expression state to be formed in one-component systems in which one kind of a radical polymerizable monomer and carbon dioxide exist, or in multi-component

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systems in which two or more kinds of radical polymerizable monomers and carbon dioxide exist in a fluoropolymer producing method in **independent claim 2**, DeSimone et al disclose the fluoromonomers maybe in liquid state (Col. 3, line 5-7). In one preferred embodiment, the CO<sub>2</sub> is utilized in a “supercritical” phase (Col. 2, line 53-54).

As to radical polymerizable monomer comprising a fluorine-containing ethylenic monomer in a fluoropolymer producing method in **independent claim 2**, DeSimone et al disclose examples of suitable fluoromonomers including, but not limited to, fluoroolefins and partially fluorinated monomers, particularly vinylidene fluoride, vinyl fluoride (Col. 3, line 14-22).

As to a ratio [Mw/Mn] of the weight average molecular weight [Mw] on the styrene equivalent basis to a number average molecular weight [Mn] of the fluoropolymer on the polystyrene equivalent basis to be higher than 1 but not higher than 3 in a fluoro-polymer producing method in **independent claim 2**, DeSimone et al disclose the fluoropolymer having a weight average molecular weight to number average molecular weight ratio of from about 2 to about 10 (Col. 1, line 51-54).

As to fluoropolymer having a weight average molecular weight [Mw] of not lower than 150,000 as determined on the polystyrene equivalent basis in a fluoropolymer producing method in **independent claim 1**, in view of the substantially identical fluoropolymer producing reaction disclosed by DeSimone et al and by applicants, it is examiner’s position to believe that the fluoropolymer produced by DeSimone et al would inherently possess the Mw of not lower than 150,000 as claimed. Since USPTO does not have proper means to conduct the experiments, the burden now is shifted to applicants to prove otherwise. *In re Fitzgerald*, 205 USPQ 594 (CCPA1980).

As to the pressure not higher than 40 Mpa and temperature of not higher than by 100 °c than the supercriticality-expression temperature of defined reaction-field in **claim 3**, DeSimone et al disclose, in one embodiment, CO<sub>2</sub> having a pressure from 500 to about 10,000 psia (Col. 2, line 49-52). Temperature ranges from about –50°C to about 500 °C (Col. 2, line 62-63).

As to chain transfer agent in **claim 13**, DeSimone et al disclose, in one preferred embodiment, the polymerization reaction mixture including a chain transfer agent for regulating the molecular weight of the resulting polymer (Col. 4, line 56-59).

As to reaction vessel at least 8 g/l of capacity in a steady-state of continuous polymerization in **claim 14**, DeSimone et al disclose any appropriately designed reaction vessel (Col. 5, line 14), in absence of showing the criticality of the records, the optimization reaction volume of at least 8 g/l in a known process render prima facie obviousness within one of ordinary skills in the art. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

As to radical polymerization initiator in **claim 15**, and initiator being organic peroxide in **claim 16**, selection of organic peroxide in **claim 17**, DeSimone et al disclose a polymerization initiator to be peroxydicarbonate (Col. 4, line 30).

As to limitation of **claim 19**, DeSimone et al disclose the polymerization being carried out in continuous methods, which would require continuously supply monomers and continuously discharge product (Col. 5, line 11-14).

As to optionally additional components in amount which substantially do not influencing supercriticality-expression pressure, temperature of defined reaction field in **claim 21**, DeSimone et al disclose, Examples which shows the stability of the reaction-field.

As to one or more kinds of radical polymerizable monomers substantially influencing a phase state in **claim 23**, DeSimone et al disclose, mixture of monomers and carbon dioxide into the reaction vessel, it would be obvious to influence the phase state based on the phase rules.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1,2 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ives Wu whose telephone number is 571-272-4245. The examiner can normally be reached on 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Examiner: Ives Wu

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Date: August 6, 2007

DUANE SMITH  
PRIMARY EXAMINER

  
8-7-07